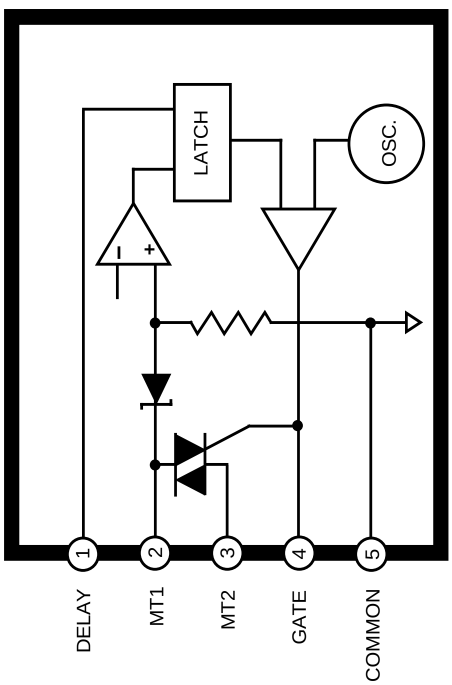
INTERIM DATA SHEET
(Subject to change without notice)
August 16, 1994

STR83145 AND STR84145

Data Sheet **28190**

LATCHED, UNIVERSAL INPUT-VOLTAGE SWITCHES



Dwg. PK-005

Intended for power supplies with universal inputs (85 V to 265 V rms), the STR83145 and STR84145 latched, universal input-voltage switches incorporate timing, control, and drive circuitry with a high-current triac (bidirectional triode thyristor) switch. Each device senses the applied ac line potential and automatically switches the rectifier and associated capacitors between a voltage-doubler configuration (for line voltages to 141 V) and a full-bridge configuration (for line voltages greater than 149 V). This eliminates the possibility of user error with adjustable jumpers or switches. Also, the related switch-mode power stage need operate only over a reduced range of dc input voltages when compared with "wide input" power supplies using a bridge rectifier only. The reduction in dc input voltage range permits the use of lower-voltage capacitors and leads to a reduction in power stage stresses and power dissipation. The STR83145 and STR84145 differ only in their maximum ac current rating (10 A and 12 A, respectively).

The internal sensitive-gate triac is switched by a temperature-compensated constant-current gate driver driven by a 15 kHz pulse train to reduce power dissipation. The switch-over voltage is accurately set during manufacture for consistent operation. An user-adjustable delay is provided to ensure start-up in the full-bridge mode. Once established (by an input voltage greater than 149 V rms), an integral latch holds the full-bridge mode to preclude false application of the doubler mode during brownouts, voltage droops, or missing cycles.

The requirements of low transient thermal impedance and steady-state thermal resistance are satisfied in a molded, 5-lead single in-line power package. Similar input-voltage switches, with a switch point of 159 V rms, are also available.

ABSOLUTE MAXIMUM RATINGS

Repetitive Peak OFF-State Voltage,
V_{DRM} .... **500 V**

Static ON-State Current, $I_{T(RMS)}$
STR83145 .... **10 A**
STR84145 .... **12 A**

Non-Repetitive Surge ON-State Current, I_{TSM}
STR83145 .... **100 A**
STR84145 .... **120 A**

Package Power Dissipation,
P_D .... **See Graph**

Triac Junction Temperature, T_J ..... **+125°C**

Frame Temperature, T_M .... **+100°C**

Operating Temperature Range,
T_A .... **-20°C to +125°C**

Storage Temperature Range,
T_{stg} .... **-40°C to +125°C**

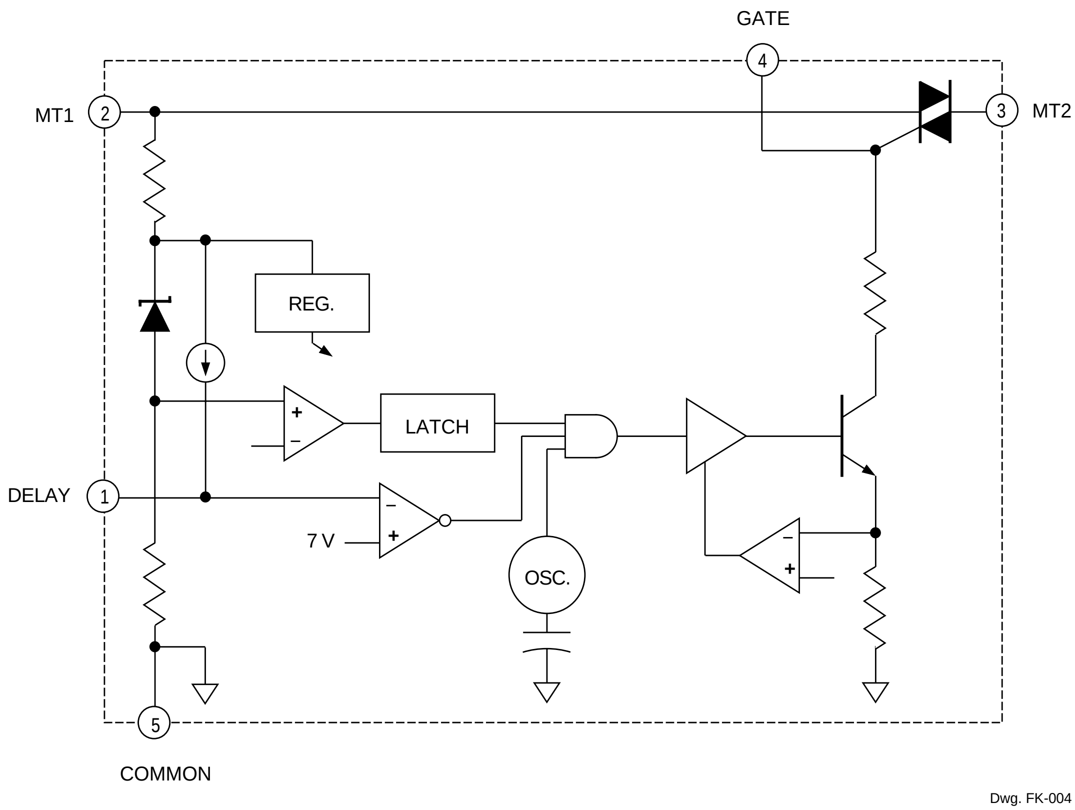
FEATURES

- Low Duty Cycle Triac Drive for Minimum Dissipation
- For Universal Input Operation Between 85 V rms and 265 V rms to 10 A or 12 A
- Internal Latch Prevents False Mode Switching
- Internal Sensitive-Gate Power Triac
- Adjustable Start-Up Delay
- Accurate 145 V rms Switch-Point Voltage
- Low External Parts Count
- Low Power Dissipation
- Low-Power External Parts

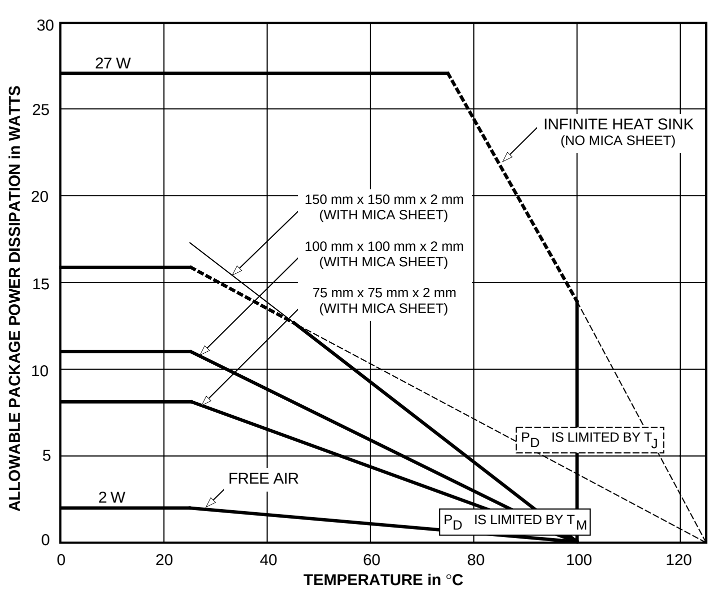
Always order by complete part number:

Part Number	Max. On-State Current
STR83145	10 A rms
STR84145	12 A rms

FUNCTIONAL BLOCK DIAGRAM

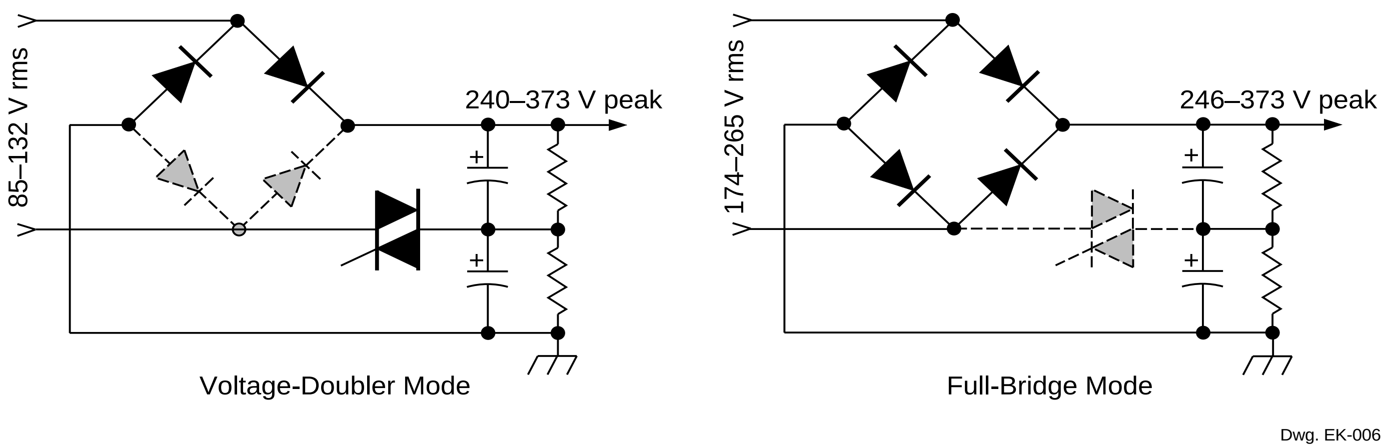


ALLOWABLE PACKAGE POWER DISSIPATION



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SIMPLIFIED OPERATION

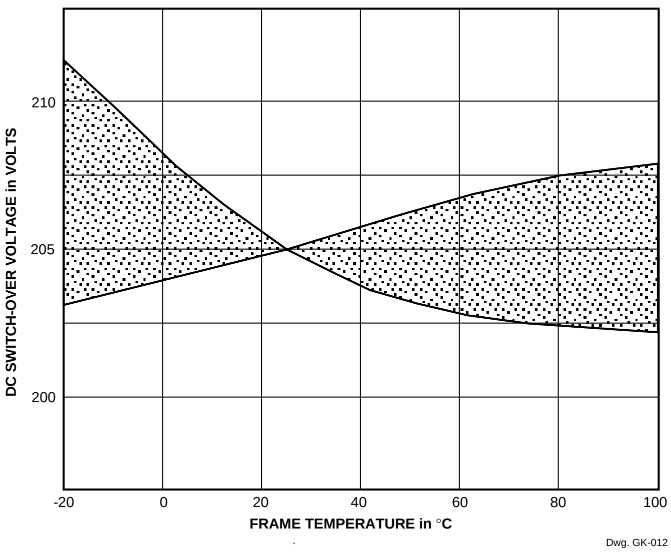


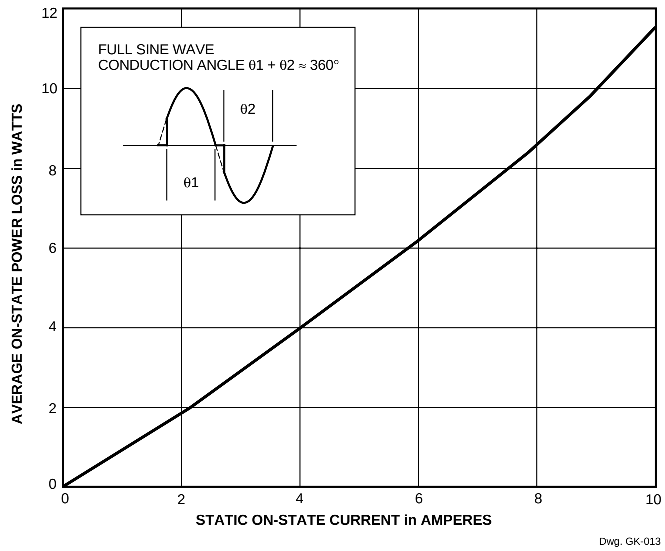
ELECTRICAL CHARACTERISTICS at T_A = +25°C, voltage measurements are referenced to Common (pin 3) (unless otherwise noted).

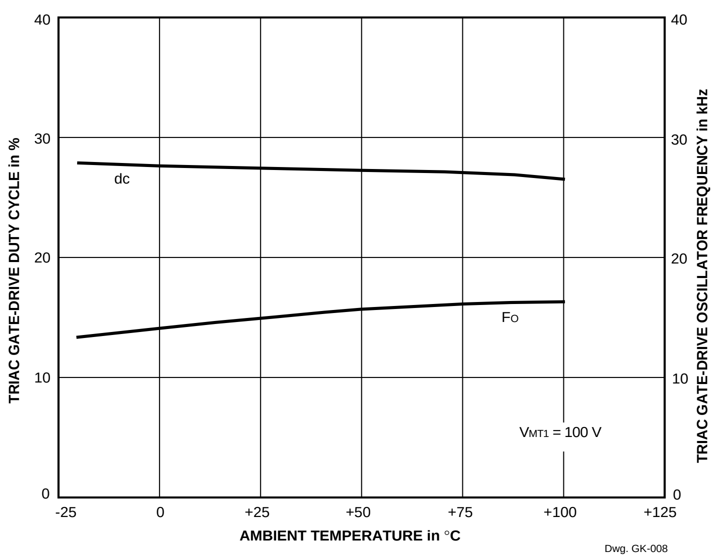
Characteristic	Symbol	Test Conditions	Limits Min.	Typ.	Max.	Units
On-State Voltage	V_{TM}	STR83145, I_T = 10 A*	–	–	1.8	V
		STR84145, I_T = 12 A*	–	1.6	–	V
Off-State Current	I_{DRM}	STR83145, V_D = 500 V	–	–	100	µA
		STR84145, V_D = 500 V	–	40	–	µA
Starting Voltage	V_S	V_T = 2 V	–	–	100	V
Startup Time Delay	t_D	C_2 = 1 µF, $V_{MT1} \geq$ 100 V dc	40	–	100	ms
DC Switch-Over Voltage	V_C	$V_{DELAY} \leq$ 1 V	200	205	210	V
Temperature Coefficient of Switch-Over Voltage	α_{VC}	-20°C ≤ T_M ≤ +100°C	–	±45	–	mV/°C
Input Current	I_{MT1}	Voltage-doubler mode, V_{MT1} = 195 V	–	–	10	mA
		Full-bridge mode, V_{MT1} = 400 V	–	–	6.5	mA
Delay Terminal Voltage	V_{DELAY}		–	–	7.0	V
Triac Gate-Drive Osc. Freq.	f_o	V_{gate} ref. MT1, V_{MT1} = 100 V	–	15	–	kHz
Latch Reset Voltage	V_R	V_{GATE} = 400 mV	2.0	–	15	V
Thermal Resistance	$R_{\theta JM}$	FET channel to mounting surface	–	–	1.8	°C/W

NOTES: Negative current is defined as coming out of (sourcing) the specified device terminal.
Typical Data is for design information only.
*In practical use, I_T is recommended derated to 70%.

TYPICAL CHARACTERISTICS





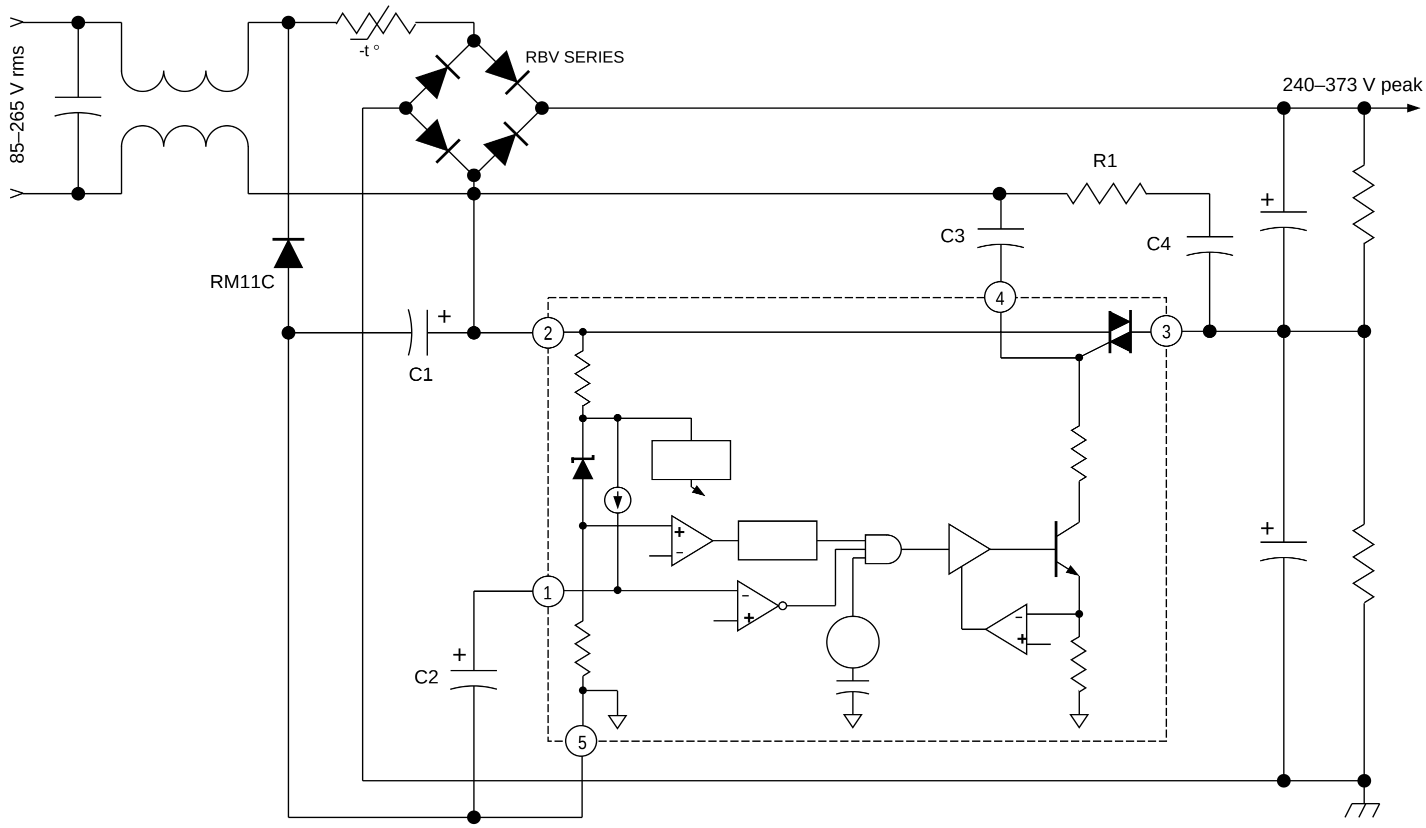


APPLICATIONS INFORMATION

WARNING — These devices are designed to be operated at lethal voltages and energy levels. Circuit designs that embody these components must conform with applicable safety requirements. Precautions must be taken to prevent accidental contact with power-line potentials. Do not connect grounded test equipment.

The use of an isolation transformer is recommended during circuit development and breadboarding.

TYPICAL APPLICATION



Dwg. EK-007

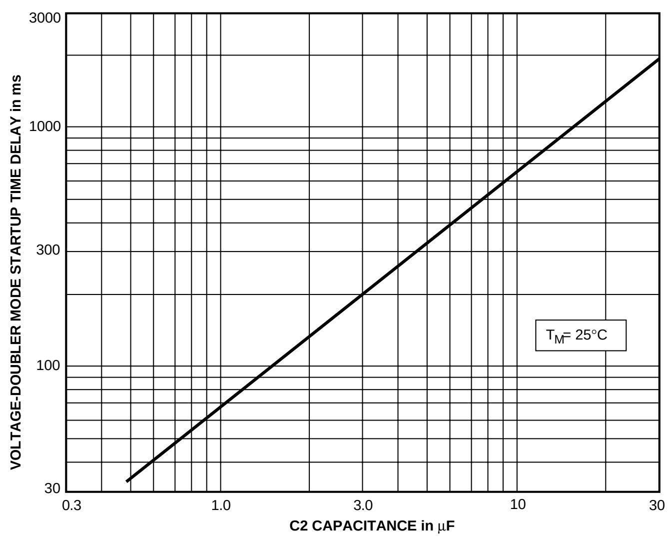
External component values have been selected for optimum device performance and reliability. Except for C_2, component values other than the following may result in false operation of these devices.

C_1 = 4.7 µF, 400 V
C_2 = 1 µF, 50 V
C_3 = 0.047 µF, 50 V
C_4 = 0.047 µF, 250 V
R_1 = 4.7 Ω

Turn-ON delay (forced full-bridge mode) may be adjusted for desired system performance:

$$t_D \approx 68 \times C_2$$

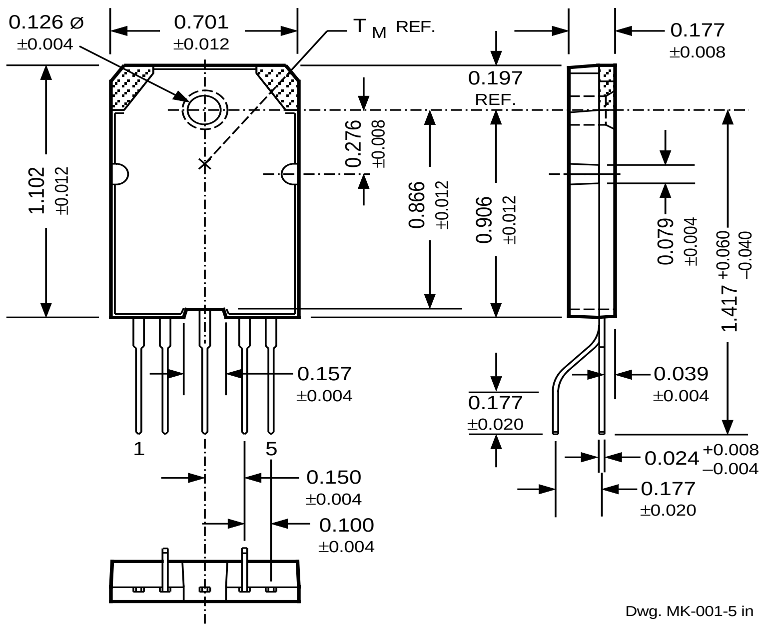
where t_D is the delay time in ms
C_2 is capacitance in µF



Dwg. GK-011

Dimensions in Inches

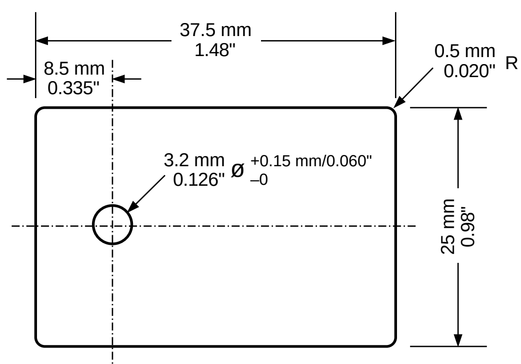
(Based on 1 mm = 0.03937")



Dwg. MK-001-5 in

NOTE: The hatched area is exposed heat spreader, electrically common to pin 3.

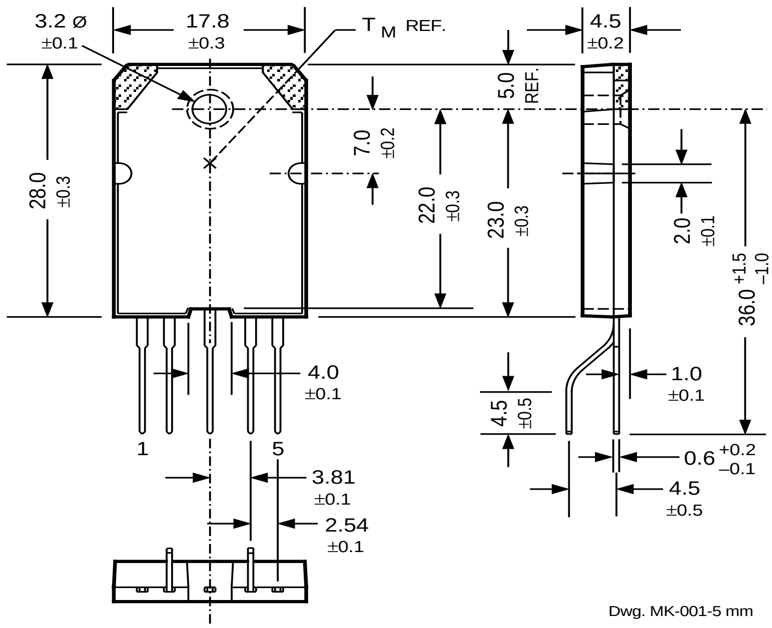
NOTES:
1. Exact body and lead configuration at vendor's option within limits shown.
2. Recommended mounting hardware torque: 4.34 – 5.79 lbf•ft.
3. The hatched area is exposed heat spreader, electrically common to pin 3.
4. Recommended 0.003" to 0.006" thick mica insulator with metal-oxide-filled, alkyl-degenerated oil base, silicone grease (Dow Corning 340, or equivalent); or Bergquist Sil-Pad®.



Dwg. MK-004

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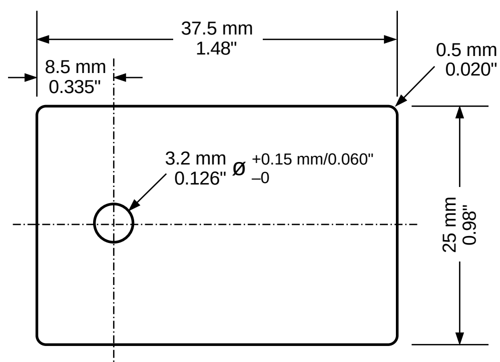
Dimensions in Millimeters



Dwg. MK-001-5 mm

NOTE: The hatched area is exposed heat spreader, electrically common to pin 3.

NOTES:
1. Exact body and lead configuration at vendor's option within limits shown.
2. Recommended mounting hardware torque: 6 – 8 kgf•cm (0.588 – 0.785 Nm).
3. The hatched area is exposed heat spreader, electrically common to pin 3.
4. Recommended 0.08 mm to 0.15 mm thick mica insulator with metal-oxide-filled, alkyl-degenerated oil base, silicone grease (Dow Corning 340, or equivalent); or Bergquist Sil-Pad®.



Dwg. MK-004

POWER CONVERSION/POWER MANAGEMENT

SWITCHING REGULATOR PMCMs

Part Number*	Application	AC In	Max P_O	Power Switch		
5703	Quasi-Resonant Flyback Converter	110/120 V	140 W	500 V	6 A	Bipolar
5707	Quasi-Resonant Flyback Convertter	85-265 V	90 W	850 V	6 A	Bipolar
		220/240V	140 W			
5708	Quasi-Resonant Flyback Converter	85-265 V	120 W	850 V	7.5 A	Bipolar
		220/240 V	180 W			
6511	Quasi-Resonant Flyback Converter	110/120 V	180 W	450 V	11 A	MOSFET
6525	Quasi-Resonant Flyback Converter	85-265 V	120 W	600 V	6 A	MOSFET
6529	Quasi-Resonant Flyback Converter	220/240 V	180 W	800 V	5.4 A	MOSFET
6703	Quasi-Resonant Flyback Converter	110/120V	140 W	500 V	6 A	Bipolar
6704	Quasi-Resonant Flyback Converter	110/120 V	100 W	500 V	5 A	Bipolar
6707	Quasi-Resonant Flyback converter	85-265 V	90 W	850 V	6 A	Bipolar
		220/240 V	140 W			
6708	Quasi-Resonant Flyback Converter	85-265 V	120 W	850 V	7.5 A	Bipolar
		220/240 V	180 W			
6709	Quasi-Resonant Flyback Converter	85-265 V	160 W	850 W	10 A	Bipolar
		220/240 V	220 W			

* Complete part number includes additional characters to indicate operating temperature range and package style.

LINEAR REGULATOR ICs

Part Number*	V_O	Max DC In	Max Dropout	Max I_O	Package
8181	5.0 V	10 V	300 mV @ 500 mA	1.0 A	16-lead SOIC
8183	3.0 V	10 V	300 mV @ 125 mA	250 mA	6-lead SOT-89
8184	3.0 V	10 V	300 mV @ 125 mA	250 mA	SOT-89
8186	3.3 V	10 V	300 mV @ 125 mA	250 mA	6-lead SOT-89
8187	3.3 V	10 V	300 mV @ 125 mA	250 mA	SOT-89

* Complete part number includes additional characters to indicate operating temperature range and package style.

Also — 83145 and 84145 Latched, Universal Input-Voltage Switches.

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